

**VALIDATION OF THE MALAY VERSION OF
IMPACT OF EVENT SCALE-REVISED (IES-R)
AMONG FLOOD DISASTER VICTIMS IN
KELANTAN.**

By

DR AHMAD SHAHRIL BIN AB. HALIM

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PREFACE

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ABSTRAK (BAHASA MALAYSIA)

KAJIAN KESAHAN SKALA KESAN MUSIBAH-SEMAKAN (SKM-S) DI KALANGAN MANGSA BANJIR DI KELANTAN

Latar belakang: Kecelaruhan stres pascatrauma (KSPT) boleh berlaku akibat pendedahan kepada tekanan yang melampau selepas bencana dan Skala Kesan Musibah – Semakan (SKM-S) berkemungkinan adalah instrumen yang paling meluas digunakan untuk mengukurnya. Walaubagaimanapun, terdapat kekurangan bukti mengenai kajian kesahan yang lengkap berkaitan instrumen ini di dalam situasi Malaysia. Maka, objektif kajian ini adalah untuk mengesahkan skala SKM-S versi Bahasa Melayu.

Metodologi: Kajian ini merupakan kajian keratan rentas yang dijalankan antara April sehingga Jun 2015 melibatkan seramai 168 peserta yang terlibat dalam kejadian banjir di daerah Kuala Krai. Proses penterjemahan, kesahan muka dan kandungan telah dijalankan oleh sekumpulan pakar, diikuti dengan kajian awalan. Versi terakhir soalan kemudiannya digunakan untuk kajian kesahan. Analisis data merangkumi penilaian kesahan konstruk dengan menggunakan analisis faktor pengesahan dan kebolehpercayaan komposit melalui rho Raykov.

Keputusan: Model terakhir yang terbaik skala SKM-S versi Bahasa Melayu mempunyai dua faktor dengan 19 soalan, berbanding model asal iaitu tiga-faktor dengan 22 soalan. Hasil kajian mendapati model ini mempunyai kesesuaian model pengukuran yang baik ($CFI = 0.933$, $TLI = 0.923$, $RMSEA = 0.056$, $SRMR = 0.058$) dan nilai kebolehpercayaan komposit yang baik (Psikologi = 0.89, Tingkah laku = 0.83).

Kesimpulan: Kajian ini menunjukkan bahawa skala SKM-S versi Bahasa Melayu bercirikan model dua-faktor dengan 19 soalan mempunyai asas psikometri yang baik. Ia adalah sah dan boleh dipercayai dari segi konstruk untuk mengukur tahap stres pascatrauma di kalangan populasi yang terlibat dengan bencana di Malaysia. Kajian seterusnya di kalangan yang berhadapan jenis kejadian traumatik lain lain adalah dianjurkan untuk menyokong lagi penggunaannya.

ABSTRACT (ENGLISH)

VALIDATION OF THE MALAY VERSION OF IMPACT OF EVENT SCALE-REVISED (IES-R) AMONG VICTIMS INVOLVED IN FLOOD DISASTER IN KELANTAN

Background: Post-traumatic stress disorder (PTSD) may result from exposure to extreme psychological stress post disaster and the Impact of Event Scale-Revised (IES-R) was probably the most widely used tool used for its measurement. Nevertheless, there is lack of evidence on proper validation of this instruments used in the Malaysian context. The objective of this study was to validate the Malay version of Impact of Event Scale-Revised (IES-R).

Methods: A cross-sectional study, involving 168 participants who were involved in flood disaster in the Kuala Krai district, was conducted from April 2015 to June 2015. Back to back translation, content validity and face validity processes were conducted by a group of expert, followed by pilot study. The final version of the questionnaire then was used for the validation study. The data analyses involve assessment of construct validity by confirmatory factor analysis and composite reliability by Raykov's rho.

Results: Our final model of IES-R (Malay) consists of 2 factors with 19 items, as compared to original version with 3 factors with 22 items. Our finding showed the final model has good model fit (CFI = 0.933, TLI = 0.923, RMSEA = 0.056, SRMR = 0.058) and composite reliability (Psychological = 0.89, Behavioural = 0.83).

Conclusion: The study showed that the two-factor model with 19 items of the Malay version

of IES-R has good psychometric properties. The scale is valid and reliable to measure level of post-traumatic stress among post flood disaster population in Malaysia. Further studies in other traumatic experiences are recommended to further support its use.

Key words: Confirmatory Factor Analysis, Flood, Post-traumatic Stress Disorder, Reliability, Validity

1. INTRODUCTION

Disasters are mass traumatic events that involve many people and are frequently accompanied by loss of property and economic adversity on a large scale (1). They have been distinguished from other types of potentially traumatic events by following a definition of “massive collective stress” or “violent encounters with nature, technology, or humankind” (2). Disasters occur regularly, with one estimate their frequency at an average of 1 per day somewhere throughout the world (3).

With regards to natural disasters, many parts of the world have encountered extensive devastation as a consequence of a variety of natural disasters. These disasters include both geophysical disasters such as earthquakes, tsunamis, landslides, volcanic eruptions, as well as hydro meteorological disasters such as typhoons, rainstorms, floods, heavy snow, droughts, strong winds and heat waves. Similarly in Malaysia, although natural disaster is comparatively rare, it is an inevitable life experience that must be prepared for (4).

Natural disasters have expectable catastrophic long-term impact in terms of human health, economic (5) and social costs (6). Disasters usually affect both direct (e.g. damage to infrastructure, crops, housing) and indirect (e.g. loss of revenue, unemployment, market destabilization) costs to the local economy. Moreover, disasters also challenge one’s ability for adaptation to a significant stress, which can promote the onset of undesirable mental health outcomes (7). While risk and level of poor mental health outcomes is related to the degree of exposure to a disaster (8), the unique vulnerabilities of special populations within the affected population along with

secondary stressors play a vital role in determining the nature and severity of psychological morbidity (9).

The mental health impact in the aftermath of disaster towards the affected population are highly variable, ranging from mild to severe psychological distress or impairment that may persist for many years after the disaster (3). This long-term impact signifies a further burden to individuals whose physical and emotional strength have already been weakened by their own and their beloved's losses. Disasters in developing countries and those associated with extensive community damage are associated with negative outcome. This is partly due to shortage of human resources in psychiatry in developing countries, which leads to significant burden on psychiatric services even without the additional limitations imposed by disaster (7).

According to the World Health Organization (WHO), psychological maladaptation to the stress of disaster includes mild, moderate, and severe forms of mental disorder and psychological distress. The WHO estimates that in the general population worldwide, the baseline prevalences of mild-to-moderate and severe mental disorder is around 10% and 2% to 3%, respectively. The WHO estimates that after disaster, the general overall prevalence rates for mild-to-moderate and severe mental disorder are liable to increase to 20% and 3% to 4% of the affected population, respectively (10). Most disasters involve at least moderate psychological impairment of the affected population. These incorporate symptoms of posttraumatic stress, depression, anxiety, and other psychiatric problems, as well as specific conditions of post-traumatic stress disorder (PTSD), major depressive disorder (MDD), generalized anxiety disorder, and panic disorder.

Among the specific psychological morbidity reported among survivors post disaster, the most commonly identified and studied is post-traumatic stress disorder (PTSD) (11). Numerous instruments have been used in assessing traumatic event exposure and posttraumatic reactions (12). These instruments typically assess general traumatic event exposure, event-specific exposure (e.g., combat), PTSD or acute stress disorder, using self-report or interviewer-administered formats. Many of the instruments show acceptable psychometric properties, but vary in administration time and the trauma populations for which they were designed.

One of the most widely used tests is Impact of Event Scale-Revised (IES-R) (13), which was originally developed by Horowitz et al (14). It is a 15-item self-report measure used to assess the frequency of 2 symptoms (7 intrusion items and 8 avoidance items) associated with the experience of a traumatic event. Weiss and Marmar then added 6 items for hyperarousal symptoms and 1 item for intrusion items - a revised version of IES (15). It has been translated and validated in many languages and have been shown to have good psychometric properties.

Nevertheless, there is lack of evidence on proper validation of this instruments used in the Malaysian context. It is therefore of utmost importance to have a locally accepted version of IES-R to measure post-traumatic stress symptoms among local population.

Finding from this study would support the importance of valid and reliable screening tool for the use in disaster.

This dissertation was arranged according to the manuscript-ready format as outlined by Institute of Postgraduate Studies (IPS) office, School of Medical Sciences (16). This

dissertation and manuscript presented in this dissertation focused on the assessment of validity and reliability of Malay version of IES-R using confirmatory factor analysis (CFA).

2. LITERATURE REVIEW

2.1 Prevalence and risk factors of Post-traumatic Stress Disorder (PTSD) post disaster

Exposure to disasters has been associated with a variety of mental health consequences (1). The most common reported psychological sequelae in the aftermath of disasters are post-traumatic stress disorder (PTSD), depression, adjustment and anxiety disorder.

PTSD is one of the most commonly occurring and studied post-disaster psychopathologies (1, 3, 11). The prevalence estimates of PTSD are high. For example, in the European and US general population the 12-month prevalence of PTSD has been estimated between 2.0 and 3.5% (17, 18). However, not all traumatized individuals develop PTSD. The incidence is higher in specific high-risk groups, and certain types of trauma are more likely to result in PTSD than others.

In a systematic review of publications between the period of 1980 till February 2007 conducted by Nirea and colleague on post-traumatic stress disorder (PTSD) following exposure to natural disaster, they found that a huge range of prevalence was recorded which ranges between 3.7% and 60% in the first 1-2 years after a disaster, despite most prevalences reported are in the lower half of this range (11). These findings were consistent with previous systematic review (1, 3).

Nevertheless, higher prevalences have been reported among specific groups, including clinical samples and persons who were in areas heavily affected by the disaster (11).

Recent study following an earthquake in 2008 in Sichuan Province in China, it was found that the prevalence rates of suspected post-traumatic stress symptoms were 47.3% in heavily damaged areas and 10.4% in moderately damaged areas (19).

In Malaysia context, a local study has been conducted to determine the prevalence of PTSD among flood victims in Kuala Terengganu after the 2014 massive flood. About 10.1% from a total of 208 participants were found to have PTSD with higher prevalence in female (10.9%) than male (9.2%) (20). This finding is slightly lower compared to the earlier study after the Malaysia tsunami disaster in 26 December 2004, whereby out of 64 respondents, 19% of them developed PTSD (21).

PTSD symptoms can persist for many years after the trauma. However, longitudinal studies documented a mixed results – some showed a decline in PTSD prevalence over time (22); however, some studies also showed an increase in PTSD prevalence over time. For example, a cohort study of residents of Zhangbei-Shangyi region, northwestern China exposed to earthquake in 1998 found that the prevalence of PTSD increased from 18.8% to 24.2% between 3 and 9 months after the disaster (23).

Alongside PTSD, there is also a need to adequately consider the importance of other psychopathologies in disaster setting, with depression and anxiety disorders observed in 37% and 20%, respectively, of disaster survivors evaluated by Norris et al. (3). Major depressive disorder is a distinct disorder and frequently comorbid diagnosis with PTSD (24). The rates of PTSD in individuals reporting a lifetime history of depression range between 37% and 48% (25); and among clinical samples, as much as 68% of

individuals with PTSD meet diagnostic criteria for depression at some point of time (26).

Risk factors modify the risk of PTSD following traumatic experiences by either enhancing or diminishing the likelihood of the disorder. A systematic review and meta-analysis found nine factors that were associated with higher likelihood of PTSD. The factors were women gender, psychological factors, deteriorating psychosocial resources and support, severity of exposure to a disaster, exposure to stressors before or after the incident (secondary stressors), parenteral symptoms of PTSD, race/ ethnicity, relocation and low socioeconomic status (27).

Psychological factors that can predispose and precipitate onset of PTSD in the aftermath of disasters includes neuroticism (28, 29), guilt (30), difficulty concentrating (31), coping strategies (32), obsessive traits (33), and psychiatric comorbidity (34). Other risk factors were also identified which includes trauma severity, prior psychiatric disorders and family history of disorders (35).

2.2 Screening and assessment tools for PTSD

There are numerous instruments assessing traumatic event exposure and posttraumatic reactions which measure general traumatic event exposure, event-specific exposure (e.g., combat), posttraumatic stress (PTSD) or acute stress disorder (15, 36-39). They are either using self-report or interviewer-administered formats. They demonstrate acceptable psychometric properties, but vary in administration time and the trauma populations for which they were designed (13).

Among the most popular post-traumatic symptom assessments scale used by traumatic stress professionals includes Clinician-Administered PTSD Scale (CAPS), Trauma Symptom Inventory (TSI), PTSD Checklist (PCL) and Impact of Event Scale-Revised (IES-R). These measures have demonstrated adequate reliability and validity. They also have several potential characteristics such as easily accessible, unique among other scales and were created at institutions by authors considered among the most respectable trauma assessment experts (13).

In a systematic review of studies between the period of 1994 till February 2003 conducted by Brewin and colleague on screening instruments for adults at risk of PTSD, they found that two instruments, namely Impact of Event Scale (IES) and Trauma Screening Questionnaire (TSQ) consistently performed well and were validated on independent samples and had been tested within 1 year of a traumatic event (36).

IES-R had been revised from its original version to suit with diagnostic criteria of PTSD in Diagnostic and Statistical Manual of Mental Disorders – 4th edition (DSM-

IV) (40). IES-R has been widely used and validated in many studies related to PTSD, including in Malaysia (41). However, to use IES-R in assessing post traumatic stress in the aftermath of natural disaster, the scale need to be revalidated before it is considered valid to be use in such population.

2.3 Impact of Event Scale - Revised (IES-R)

The Impact of Event Scale (IES) was developed by Horowitz and colleagues in 1979 (14). It was widely used in research studying the psychological impact of trauma (15). It is grounded in Horowitz's model of emotional processing following a trauma (14). According to this model, until traumatic experiences are psychologically assimilated, the individual will alternate between the experience of intrusive thoughts and feelings in one moment and avoidance strategies in the next. Following this model, the IES was constructed with two subscales, one tapping intrusions (e.g., repeated thoughts about the trauma) and the other tapping avoidance (e.g., effortful avoidance of situations that serve as reminders of the trauma). Shortly after the IES was published, posttraumatic stress disorder (PTSD) was introduced into the Diagnostic and Statistical Manual of Mental Disorders – 3rd edition (DSM-III) (42). The IES has also been utilized in research studying the psychological impact of specific traumatic life events (43, 44) and used as an outcome measure in treatment studies (45, 46).

Weiss and Marmar revised the IES by inclusion of items tracking the response in the domain of hyperarousal symptoms (15). Such revision was consistent with the inclusion of hyperarousal symptoms in the diagnostic criteria of PTSD in Diagnostic and Statistical Manual of Mental Disorders – 4th edition (DSM-IV) (40). Together with the 15 items in the original IES, the Impact of Event Scale – Revised (IES-R) comprises 22 items. Furthermore, Weiss and Marmar revised the scoring method for the Impact of Event Scale-Revised (IES-R). The original IES evaluates the frequency of symptoms within the previous week on a 4-point scale (0, 1, 3, and 5) with scores range from 0 to 35 for intrusion, 0 to 40 for avoidance, and 0 to 75 for the total IES. In contrast, the

IES-R evaluates the severity of symptoms experienced during the previous week on a 5-point scale (0 to 4) with total score ranging from 0 to 88. Subscale scores can also be calculated for the intrusion, avoidance, and hyperarousal subscales. The authors recommend using means instead of raw sums for each of these subscales scores, in which higher scores indicates higher impact of the event (15).

Ever since it been introduced, it has been translated and validated into multiple different language, including Swedish (47), German (48), Spanish (49), Italian (50), French (51), Japanese (52), Chinese (53), Korean (54), Sri Lanka (55), Greek (56), Turkish (57) and Malay (41). The available Malay version, as mentioned above, warrants for revalidation for the usage among survivors of natural disaster because it was previously validated in post partum women underwent Caesarean section surgery.

IES-R has been shown to have good psychometric properties. Weiss and Marmar reported the psychometric data from two samples: emergency personnel exposed to a freeway collapse and workers from the 1994 Northridge earthquake. The IES-R showed high internal consistency, with coefficient alphas ranging from 0.87 to 0.92 for intrusion, 0.84 to 0.85 for avoidance, and 0.79 to 0.90 for hyperarousal. Test–retest correlation coefficients ranged from 0.57 to 0.94 for intrusion, 0.51 to 0.89 for avoidance, and 0.59 to 0.92 for hyperarousal (15).

2.4 Validity and reliability assessment of a measurement tools

Validity is generally defined as the ability of a measurement to measures what it intended to measure. Validity used to be divided into 3Cs (58), namely content validity, criterion validity and construct validity. Nowadays, validity is described differently under the unitary concept of validity (59, 60). The validity evidence can be obtained from five sources (59, 60), such as content, internal structure, relations to other variables, response process and consequences.

In process of validating a measurement tool, it is usually started with forward translation of the scale from its origin language, back translation and followed by content validity assessment by a group of expert in the respective field. Pilot study then was conducted to gauge participant's understanding towards the harmonised version of the questionnaire. Final version of the questionnaire then used in validation study to assess its validity and reliability. Evaluation of its internal structure is one of most important statistical analysis to measure its validity.

Internal structure evidence is the extent of how the relationships between the test items and components reflect the construct of the assessment tool (60). Evidence based on internal structure can be obtained from two analytic processes, namely factor analysis and reliability testing (59).

Factor analysis is defined as a multivariate statistical analysis where factors structure of a measurement tools can be determined in mathematical way. The basis behind this analysis is the determination of number and nature of factors that are responsible for the

correlations among items (61). From a number of outcomes (observed variables), factors are extracted and determined. These factors are unobserved/latent independent factors. The analysis can be exploratory in nature i.e. Exploratory Factor Analysis (EFA) or confirmatory i.e. Confirmatory Factor Analysis (CFA)(61).

In CFA, it deals with measurement model validity. For a measurement model to be valid, two aspects are looked into, namely model fit and factor loadings. The standardized loadings were inspected for statistical significance and estimates of 0.40 and above. Items failing to fulfil both criteria were deleted. Evaluation of model fitness was then carried out using fitness indices as listed in Table 1 with the accompanying recommended cut-off values. Considered together, they offer a more consistent evaluation of the fit of the model (61).

Table 1. Summary of fit indices.

Fit index	Cut-off points	Comments
Chi square for goodness-of-fit (GOF)	P-value > 0.05	Non significant P-value indicates good model fit to the data that we have. But as it is very sensitive to sample size, it is commonly used reported but not a must to have non significant P-value for chi-square
Absolute fit index		
<ul style="list-style-type: none"> SRMR (standardized root mean square residual) 	< 0.08	Based on guidelines by Brown, 2015
Parsimony correction fit index	RMSEA & 90% CI < 0.06 CI fit > 0.05	
<ul style="list-style-type: none"> RMSEA (root mean square error of approximation) 	< 0.08 (adequate, less restrictive)	Based on guidelines by Brown, 2015

Comparative fit indices

- | | | |
|--|------------------|------------------------------------|
| <ul style="list-style-type: none">• CFI (comparative fit index)• TLI (Tucker-Lewis index) | Both ≥ 0.95 | Based on guidelines by Brown, 2015 |
|--|------------------|------------------------------------|
-

Reliability generally is defined as consistency or reproducibility of measurement over time or occasions (62). It is “the extent to which repeated measurements of a stable phenomenon – by different people and instruments, at different times and places – get similar result” (62). Reliability is generally divided into four types (63), namely test-retest reliability, parallel-forms reliability, interrater reliability and internal consistency reliability.

Internal consistency reliability is the degree to which responses are consistent across the items within a construct i.e. measure the same thing in similar direction for a particular subject (63). In other words, how homogenous the items in a construct in term of their variance. Low internal consistency means that the items are heterogeneous within a construct i.e. do not measure the same factor, thus the total score is not the best way to summarize the construct (63). When responses for items within a construct are positively correlated to each other, they may measure the same factor. In this case, high internal consistency is obtained. In comparison to the rest of reliability types, it only requires measurement on a single occasion.

Evaluation of internal consistency reliability can be done using Cronbach’s alpha and/or Raykov’s rho. Cronbach’s alpha coefficient is a common way to indicate internal consistency of a construct. Its value ranges from 0 to 1. A generally acceptable cutoff value is 0.7 and above, while 0.6 is acceptable in exploratory research (64). Raykov’s

rho, meanwhile, indicates the construct/composite reliability of a factor for a CFA model with good fit. Reliability by Raykov's rho (65) is one of the reliability indices in CFA context. Construct reliability ≥ 0.7 (65) is considered as acceptable.

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3. OBJECTIVES

3.1 General Objective

The aim of this study is to validate the Malay version of Impact of Event Scale-Revised (IES-R), to estimate the prevalence of psychological morbidity and identify factors associated with psychological morbidity among adult victim affected by flood disaster in Kelantan.

3.2 Specific Objectives

3.2.1: To validate the Malay version of Impact of Event Scale-Revised (IES-R) among adult affected by flood disaster in Kelantan.

3.2.2: To estimate the prevalence of psychological morbidity among adult affected by flood disaster in Kelantan.

3.2.3: To identify the sociodemographic factors associated with impact of the flood disaster among the victims.

Note: Objectives 3.2.2 and 3.2.3 were not reported in the manuscript presented in this dissertation as it focused on the objective 3.2.1. The results for the both remaining objectives were included in the additional results subchapter in Appendices.

4. MANUSCRIPT

4.1 Title:

**VALIDATION OF THE MALAY VERSION OF IMPACT OF EVENT SCALE-
REVISED (IES-R) AMONG VICTIMS INVOLVED IN FLOOD DISASTER IN
MALAYSIA**

**Authors: Ahmad Shahril AB. HALIM^{1*}, Asrenee AB RAZAK¹, Azizah
OTHMAN¹, Sharifah Zubaidiah SYED JAAPAR¹, Azidah ABDUL KADIR²,
Juwita SHAABAN², Norzila ZAKARIA¹, Mohd Azhar MOHD YASIN¹, Azwany
YAACOB³, Wan Nor ARIFIN⁴ & Hasanah CHE ISMAIL¹**

¹Department of Psychiatry, School of Medical Sciences, Universiti Sains Malaysia,
16150 Kubang Kerian, Kelantan, Malaysia

²Department of Family Medicine, School of Medical Sciences, Universiti Sains
Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

³Department of Community Medicine, School of Medical Sciences, Universiti Sains
Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

⁴Unit of Biostatistics and Research Methodology, School of Medical Sciences,
Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

***Corresponding Author:**

Dr Ahmad Shahril Ab. Halim

MBBS (UM)

Department of Psychiatry, School of Medical Sciences, Universiti Sains Malaysia,
16150 Kubang Kerian, Kelantan, Malaysia

Tel: +609-7676710

Fax: +609-7659057

Email: shahrilabhalim@gmail.com

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